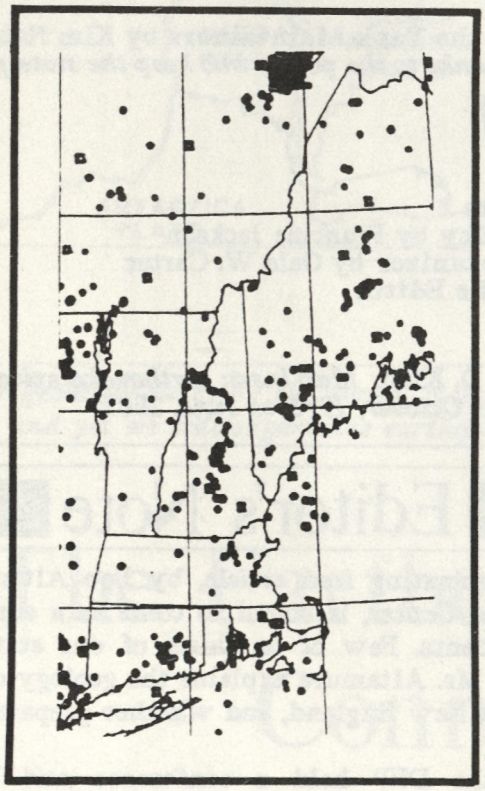
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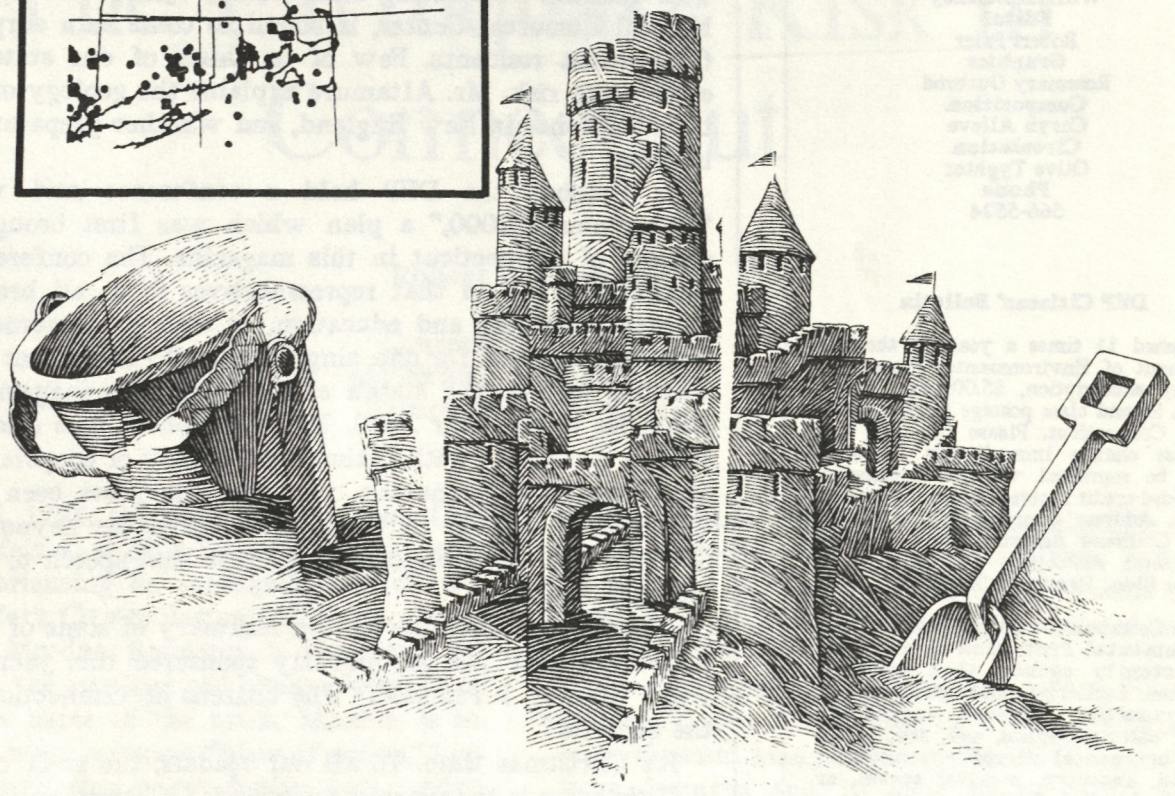
Citizens' Bulletin

Volume 14 Number 4 December 1986 $5/yr.
The Connecticut Department of Environmental Protection



EARTHQUAKES IN CONNECTICUT:

What is the risk?



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Editor's Note

This month's fascinating lead article, by Bob Altamura of DEP's Natural Resources Center, is bound to come as a surprise to many Connecticut residents. Few of us think of our state in terms of earthquake risk. Mr. Altamura explains the geology of earthquakes, their incidence in New England, and whether preparations might be in order.

In October, the DEP held a conference and workshops on "Environment/2000," a plan which was first brought before the citizens of Connecticut in this magazine. The conference was a remarkable event, in that representatives from all branches of government, business, and education, as well as concerned private citizens, got together for one, single, critically important purpose – the working out of the state's environmental management goals and strategies to the year 2000. The atmosphere was electric. The conference was filled with enthusiasm, a spirit of cooperation, and hope. Mr. Russell L. Brenneman, who has for years been a leading environmental activist in Connecticut, gave the keynote speech. The *Citizens' Bulletin* is honored to present that speech to the wider audience it deserves.

Also, in this issue, we have a summary of some of the legislation which the DEP has successfully sponsored this year. As Commissioner Stanley J. Pac said, "The citizens of Connecticut will derive the benefits."

It's Christmas time. To all our readers, the staff of the *Citizens' Bulletin* extends the warmest wishes for a happy holiday season. R.P.

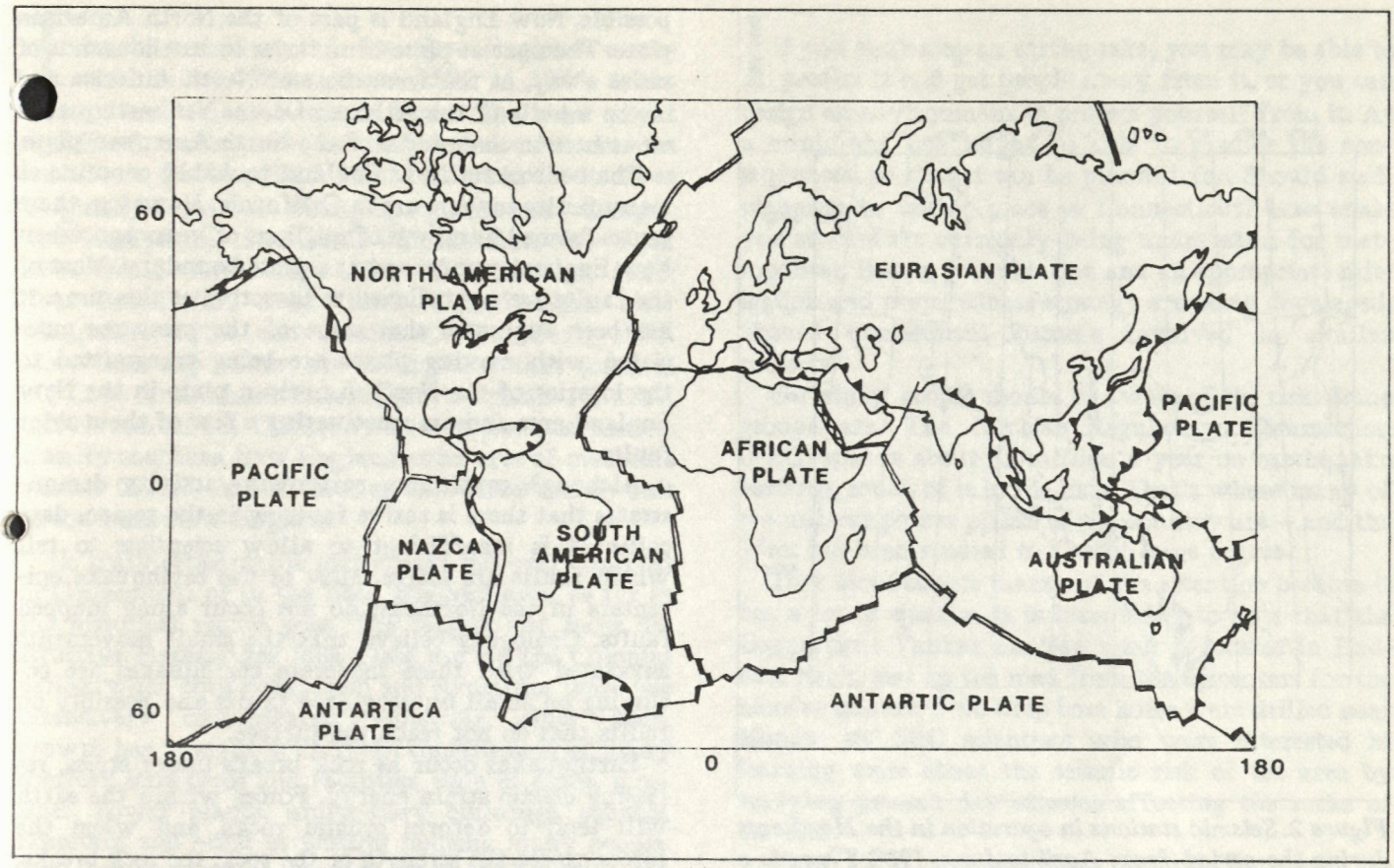


Figure 1. Major geologic plates of the world. Note that Connecticut is located in the interior of the North American plate, and yet we still experience earthquakes.

The Earthquake Risk in Connecticut

by
Robert J. Altamura
Geologist
Connecticut Geological
and Natural History Survey
Natural Resources Center

On May 16, 1791, the citizens of Moodus, Connecticut, felt a violent shaking of the earth. They were experiencing an earthquake which was felt from New York City to Boston. Only minor damage occurred in Moodus. Residents of the town had long experienced the rumbles and shakes from small earthquakes. The name of the town, Moodus, is actually an Indian word meaning "place of noises." Legends and tales involving angry Indian gods, underground volcanoes, or even mysterious gems, have been used to explain these noises. Recent scientific studies by seismologists (earthquake scientists) have confirmed that the sounds come from swarms of relatively frequent small earthquakes centered near the surface of the earth.

Another significant quake occurred in the early morning hours of November 18, 1755, near Cape Ann, Massachusetts. Many chimneys and walls near Boston were damaged and, in some places, small fissures opened up in the ground. Any report of the 1755 Cape

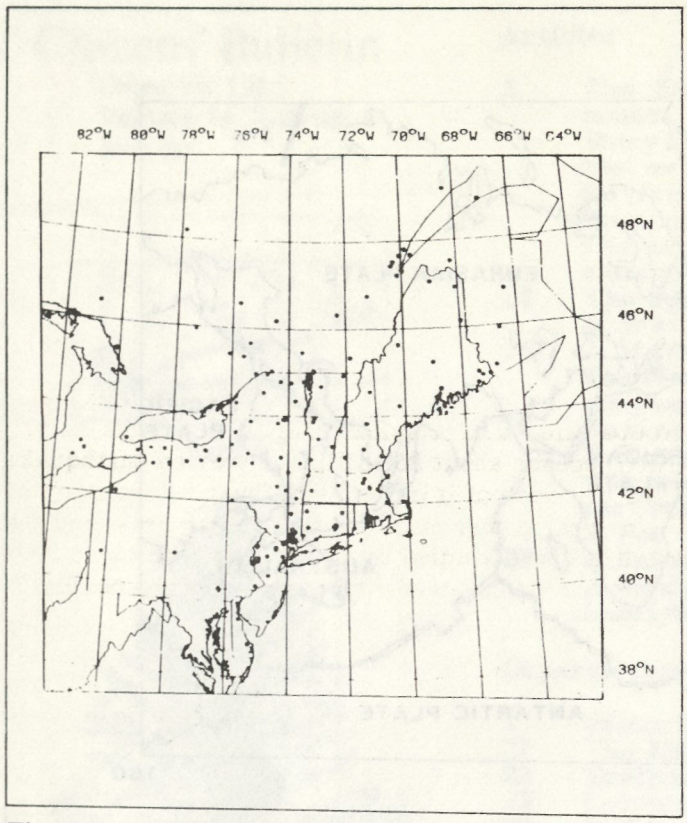


Figure 2. Seismic stations in operation in the Northeast during the period from April to June, 1983. There is a large number of stations near the Moodus seismic area.

Ann quake invariably includes the story of how a weather vane atop Fanieul Hall in Boston broke off and fell as a result of the shaking.

During 1982, there was an earthquake swarm near Albany, New York, just as there was one that year in Moodus. The Albany quakes were eight miles deep, while earthquakes near Moodus rarely exceed one half mile in depth. Why? What is geologically different between these two locations and why do earthquakes even occur in New England?

Earthquakes are caused by the movement of distinct geologic blocks or plates (Figure 1) over the upper part of the earth's crust. These plates form a relatively thin brittle rock "skin" covering the planet. The plates slowly move as the earth's internal heat is released by convection cells (or very slow movement of semi-plastic rock of the earth's interior). As the plates move, they bump and grind against each other, causing earthquakes. Cracks which form during earthquakes stay preserved in the earth as faults (Figure 3). An example of a major fault is the San Andreas fault of California (Figure 4). This fault represents the boundary between two large plates — the Pacific and the North American plates. Most earthquakes in California are associated with the grinding of these plates.

Such a simple explanation in New England is not possible. New England is part of the North American plate. The nearest plate boundaries occur thousands of miles away, at the west coast of North America and in the middle of the Atlantic Ocean. Yet earthquakes occur here in the middle of the North American plate.

The bedrock in New England probably contains as many faults as there are in California. However, these faults formed hundreds of millions of years ago when New England was indeed at a plate boundary. Most of the faults are not believed to be active at this time. It has been suggested that some of the pressures associated with moving plates are being transmitted to the interior of the North American plate in the New England area and are reactivating a few of these older faults.

Although continuing earthquake activity demonstrates that there is active faulting in the region, data collected is insufficient to allow scientists to tell which faults are active. Most of the earthquake epicenters in the Northeast do not occur along mapped faults. Geologists believe that the small movements associated with these moderate earthquakes are occurring on small unrecognized faults and possibly on faults that do not reach the surface.

Earthquakes occur as rock breaks under stress, releasing elastic strain energy. Forces within the earth will tend to deform crustal rocks, and when the forces exceed the strength of the rock, the rock breaks, sending waves throughout the earth. These waves finally reach the surface, causing the vibrations which we refer to as earthquakes (Figure 4).

The point in the earth at which the earthquake actually occurs is known as the **hypocenter**, or **focus**. It is specified by latitude, longitude, depth, and origin time. The point on the surface of the earth directly above the hypocenter is known as the **epicenter**, and is specified simply by latitude and longitude.

The size of an earthquake is measured on the **Richter magnitude scale**, going from zero to 10. It is a logarithmic scale, so that each unit-increase in magnitude represents a 10-fold increase in size. New England earthquakes vary in size from tiny vibrations that only instruments can measure — near zero magnitude — to magnitude 4 and 5 quakes. The largest earthquakes in the world are magnitude 8 - 8.5. Significant damage can begin to occur with magnitude 5 earthquakes, and severe damage may begin to occur with earthquakes greater than magnitude 6.5.

The effect of an earthquake is specified as its **intensity**, which is quoted on a 12-point Modified Mercalli Intensity (MMI) Scale (Table 1).

All of New England is believed to have experienced shaking of at least MMI VI or greater, at one time or another. Fortunately, the damage from the larger quakes has generally been minor. There have been few earthquake-related deaths or injuries. Nonetheless, scientists still consider New England to be an area of moderate seismic hazard.

The historical record for New England earthquakes runs from about 1534 to 1974, when modern instrumental records begin. The most recent significant earthquakes in the Northeast occurred in: LaMalbaie, Quebec, 1925 (MMI IX, felt as far south as Virginia); a pair of damaging quakes near Ossipee, New Hampshire, 1940 (MMI VII); Massena, New York 1944 (MMI VIII); Cape Ann, Massachusetts, 1963; New Brunswick, 1982 (MMI VII); Laconia, New Hampshire, 1982; and Goodnow, New York, 1983. More than any others, the earthquakes that occurred off Cape Ann, Massachusetts, on November 10, 1727, and November 18, 1755, may have caused scientists to classify southern New England as an area of moderate seismic hazard. All of these quakes were widely felt in southern New England.

No truly catastrophic earthquake has ever occurred in Connecticut or in the New England area, as far as the historical record goes. The largest and most destructive earthquakes took place during the Colonial period, when both population and structures were less intensively concentrated. However, since then, growth has brought with it the construction of many complex structures and facilities, such as dams, pipelines, power plants, multi-story buildings, schools, hospitals, and other structures housing many people. The question increasingly faced by building designers, engineers, and civil preparedness planners is: "What would happen if southern New England were to experience another earthquake as large or larger than the Cape Ann quake of 1755?" Some experts have calculated that such an event would cause widespread damage.

Recent awareness and concern regarding the earthquake hazard in New England has led to the establishment of a formal group, the New England Seismic Advisory Council (NESAC), which monitors and provides advice on: 1) earthquake preparedness efforts; 2) research; 3) public awareness; and 4) other earthquake-related issues for New England. The group consists of representatives from each New England state, the academic community, and other disciplines involved in seismic hazard mitigation, including: insurance, utilities, emergency response, and civil engineering. Information regarding NESAC can be obtained from Mr. Frank Mancuso, Director of State Emergency Management, Office of Civil Preparedness, 360 Broad St., Hartford 06106, phone 566-4343, or Mr. Robert Altamura, Staff Geologist with the Natural Resources Center (DEP), 165 Capitol Ave., Hartford 06106, phone 566-3540.

There is continued debate in areas of moderate seismic hazard as to whether to prepare for earthquakes by requiring special building codes and emergency plans. Massachusetts, for example, is one of the few states east of the Rockies that has a mandated seismic building code.

If you can't stop an earthquake, you may be able to predict it and get people away from it, or you can design an environment to protect yourself from it. At a minimum, one might be able to predict the consequences, so that it can be planned for. Should such planning be taking place in Connecticut? Loss analysis studies are currently being undertaken for metropolitan Boston -- evaluation and an appropriate mitigation and preparedness strategy are being developed. Should Connecticut become involved in similar projects?

Certainly, people should be aware of the risk. Some groups are. The Nuclear Regulatory Commission (NRC) spends about $5 million a year on earthquake research, much of it in the East. That's where many of the nuclear power plants of the country are -- and the West has been studied to a very large degree.

Tiny Moodus gets plenty of the attention because it has a lot of quakes. It is interesting to note that the Connecticut Yankee nuclear plant is located in Haddam Neck, just up the road from the epicenters for the Moodus quakes. Two deep bore holes were drilled near Moodus by NRC scientists who were interested in learning more about the seismic risk of the area by studying present day stresses affecting the rocks of the area.

Since 1975, the Northeast Seismic Network has maintained a number of seismic stations measuring earthquakes in the New England Region. Ten stations are operated in Connecticut -- six in the Moodus area. This network has provided a great deal of detailed

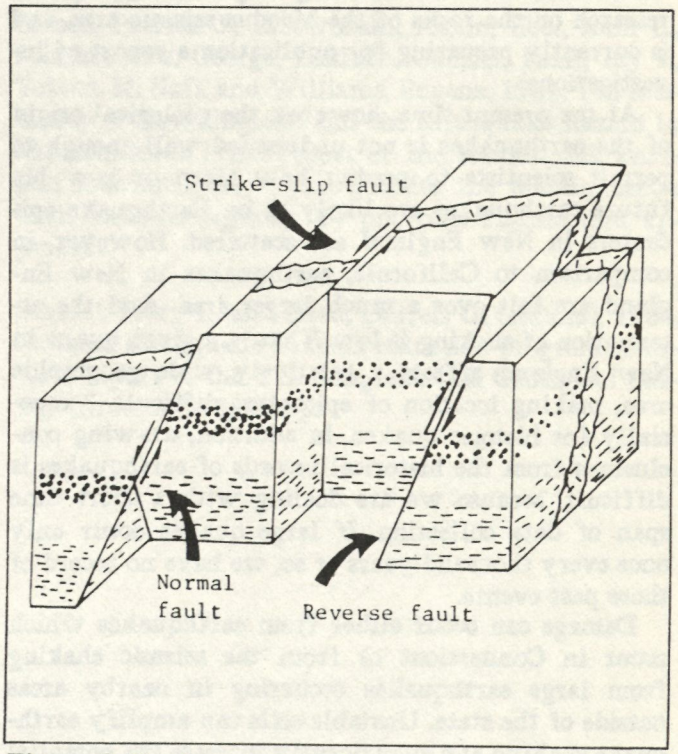


Figure 3. Various types of common faults. Dip-slip (normal and reverse faults) and strike slip faults are shown.

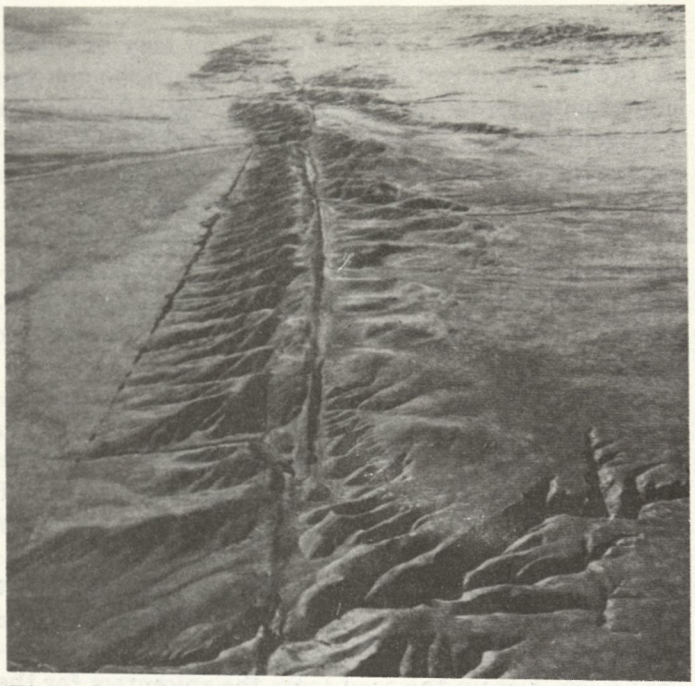


Figure 4. The San Andreas Fault in California. Geologic studies suggest that great earthquakes occur here about every 140 to 300 years.

information about earthquakes which continue to occur in the region which would otherwise be unavailable.

With the goal of getting a better understanding of the geology of the Moodus area, and therefore the seismicity, the Natural Resources Center has been involved in detailed bedrock geological mapping and research on the rocks of the Moodus seismic area, and is currently preparing for publication a report of investigations.

At the present time, however, the geological origin of the earthquakes is not understood well enough to permit scientists to predict how often or how big future earthquakes are likely to be. Earthquake epicenters in New England are scattered. However, in comparison to California, earthquakes in New England are felt over a much larger area. And the attenuation of shaking is low. That is, a given quake in New England affects a relatively wide geographic area, making location of epicenters difficult – especially for historic quakes. In addition, drawing conclusions from the historical records of earthquakes is difficult, because we are dealing with a short time span of data collection. If large quakes occur only once every thousand years or so, we have no record of those past events.

Damage can occur either from earthquakes which occur in Connecticut or from the seismic shaking from large earthquakes occurring in nearby areas outside of the state. Unstable soils can amplify earthquake shaking and significantly increase the potential for damage. An example of the importance of this is the recent Mexican earthquake where little or no seismic code regulations exist and most of the building damage and collapse occurred in areas of filled land. In Connecticut, the location and characteristics of these soils has not been specifically studied, but it is known that glacial lake clays (potentially unstable substrata) are present under and north of the city of Hartford.

In recent times in New England, the January 1982 quake in New Brunswick affected areas as far away as Connecticut. It is interesting to note that only the Central Valley felt any significant shaking (IV-V). This is believed to be due to contrasting soil types present within the Central Valley as compared to those present within the highlands.

The effect on buildings which have been built on a potentially unstable soil – typically, certain types of artificial fill or saturated, very fine-grained glacial stratified drift – is such that the intensity of a quake can increase by 1-2 units.

Modified Mercalli Intensity Scale (Simplified)

		Approx. Richter Magnitude
I	Not felt except by a few under favorable circumstances.	
II	Felt by a few persons at rest. Delicately suspended objects may swing.	2.3
III	Felt noticeably indoors. Vibrations like that of a passing truck.	3.0
IV	Felt indoors by many, outdoors by few. Dishes, windows, doors disturbed; walls make a creaking sound.	3.7
V	Felt by nearly everyone. Some dishes, windows broken. Cracked plaster in a few places.	4.3
VI	Many people frightened and run outdoors. Some heavy furniture moved; a few instances of fallen plaster and damaged chimneys.	5.0
VII	Damage negligible in buildings of good design and construction; slight to moderate in ordinary structures; considerable in poorly-built structures. Some chimneys broken.	5.6
VIII	Damage slight in well-built structures; considerable in ordinary structures with partial collapse; great in poorly-built structures. Fall of chimneys, columns, walls. Heavy furniture overturned.	6.3
IX	Considerable damage in well-built structures. Buildings shifted off foundations. Underground pipelines broken.	7.0
X	Some well-built structures destroyed. Ground badly cracked. Rails bent. Landslides considerable.	7.7
XI	Few structures remain standing. Bridges destroyed. Underground pipelines completely out of service.	8.4
XII	Damage total. Waves seen on ground surface. Objects thrown into the air.	9.0

Table 1. Modified Mercalli Intensity Scale, with approximate Richter magnitudes.

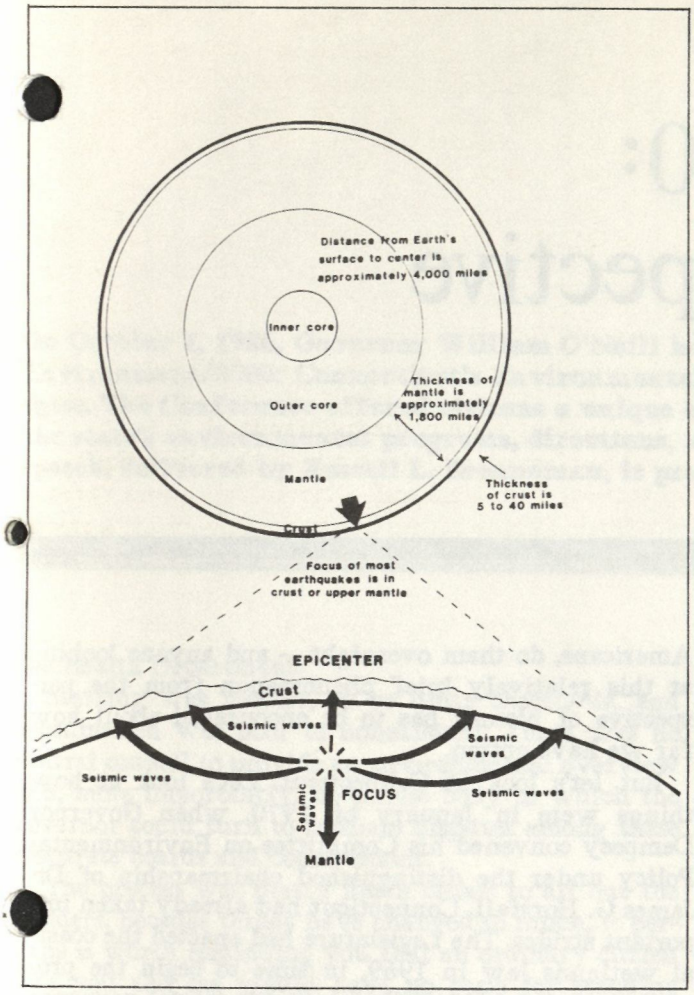


Figure 5. Cross section through the earth, illustrating the nature of seismic shaking associated with an earthquake. (Modified from Pakiser, 1981.)

At a recent Federal Emergency Management Agency (FEMA) and New England Governors' Conference (NEGC) workshop on earthquakes and earthquake preparedness in New England, Dr. M. Nafi Toksoz of MIT, reported the results of three different seismologists who had made predictions as to when New England might expect another quake of the intensity of the 1755 Cape Ann, Massachusetts, quake (Modified Mercali Intensity of VIII). Their estimates showed recurrence intervals of 450, 160, and 147 years. If the 147- or the 160-year predictions are correct -- then we are well overdue for a significant and possibly damaging earthquake here in New England.

Numbers are, after all, statistical and earthquakes need not be consistent with statistical periodicity. However, some quakes apparently do have a periodicity that is relatively regular. Other parts of the world are preparing for the earthquake hazard -- should Connecticut also make preparations?

New England is not generally thought of as an area of seismic risk. However, the probability of a damaging earthquake occurring in New England does exist. A report completed by a team of noted scientists concluded that a damaging earthquake could occur in parts of Connecticut as well as in Massachusetts, New Hampshire, Maine, and parts of Vermont and Rhode Island (Barosh et al., 1981).

Geologists at the Natural Resources Center find that: public information about the earthquake risk is not generally available, is difficult to understand and is sometimes inconsistent; current building codes may not reflect recent scientific conclusions about the seismic hazard in southern New England; very little has been done to evaluate specific hazard areas in Connecticut -- for example, ground (soil) conditions; and the New England Seismic Network and other research activities are providing valuable information for Connecticut and all of New England and need to continue to receive as much support as possible.

While there are many uncertainties about Connecticut earthquakes, one thing that can be stated with confidence is that earthquakes will continue to occur and be felt. A tremor registering 3.9 on the Richter scale centered near Northfield, New Hampshire, occurred on October 25, 1986, at the time this paper was being written. It was felt in Torrington, Connecticut. Most earthquakes will be small and hardly felt. A few will be widely felt and not cause any damage. But someday, perhaps tomorrow or perhaps not for a hundred years or more, a damaging shock will strike New England and Connecticut. ■

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Environment/2000: A Historical Perspective

by **Russell L. Brenneman**

We hold these truths to be self-evident: that it is our responsibility and the responsibility of governments empowered by us to –

- Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
- Assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings;
- Attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences;
- Preserve important historic, cultural, and natural aspects of our natural heritage, and maintain, wherever possible, an environment which supports diversity and variety of individual choice.

I have chosen the words of the Declaration of Independence to introduce these words from the National Environmental Policy Act of 1969 because the passage of that law was, in its own way, of comparable significance in that it set our national community along new paths toward utterly new objectives.

These words express, as well as any, the principal themes of the American environmental movement – the idea of trusteeship, the idea of limits, and the central role of law and government in identifying and managing toward environmental goals. These ideas were present at the beginning, and they are present today.

It is well for us to recall those words and the spirit which engendered them as we work our snail's pace way down those new paths toward goals which always seem to recede before us. Never has an industrial society tried to do all the things which we set about to do beginning in the 1960s – and, being Americans, do them overnight – and anyone looking at this relatively brief phenomenon from the perspective of history has to be encouraged about how far we have gotten.

But let's look at Connecticut. Let's look at how things were in January of 1970, when Governor Dempsey convened his Committee on Environmental Policy under the distinguished chairmanship of Dr. James G. Horsfall. Connecticut had already taken important strides. The Legislature had enacted the coastal wetlands law in 1969, in time to begin the protection of that half of Connecticut's coastal wetlands that had not been destroyed since 1900. Statutes enabling municipal conservation commissions, the acquisition of open space and its protection by easements, and providing a special tax classification for open space, were in place, largely as a result of the so-called Whyte Report, which had also been commissioned by Governor Dempsey.

Many of the parks, forests, beaches, and other recreational areas which we enjoy today had been established through the foresight of public and private bodies and the personal generosity of many of Connecticut's citizens. Much solid work had also been done on surface water quality issues by researchers at our schools of higher learning and through special *ad hoc* committees.

But, as the Governor's Committee on Environmental Policy convened early in 1970, it was also obvious that much was in disarray, both with the environment itself and with the institutional and policy mechanisms for dealing with environmental problems.

Institutionally, responsibilities for environmental matters were fragmented among 20 or so boards or commissions, many of which were grouped for housekeeping purposes within the Departments of Agriculture and Natural Resources, and some of which, such as the Clean Air Commission, were attached to

On October 8, 1986, Governor William O'Neill hosted a one-day Conference on Environment/2000: Connecticut's Environmental Goals and Management Strategies. The Conference offered citizens a unique opportunity to contribute to the state's environmental programs, directions, and priorities. The keynote speech, delivered by Russell L. Brenneman, is presented here in full.

the Health Department.

Staffing was modest, to be quite charitable, and coordination was poor to nonexistent. There was no central council to provide an environmental overview and, more importantly, no public body to which the governor could turn to mediate disputes among these disparate boards and commissions.

The process was pretty much closed to all but the insiders. Because things have changed so much, it perhaps is worth reminding you that an ordinary citizen like you and me would have no basis for standing (other than through whatever political influence we might have) before any of these boards and commissions. The idea of a public trust in environmental resources was not on the law books. If we were upset about something that some board or commission did, we could not get into court unless we had some affected property interest; and, once we got there, we would not have had the benefit of the Administrative Procedure Act. Closed meetings were held whenever anybody wanted to have one, and the citizens could not readily obtain records or information or even find out about policies being applied by boards or commissions because, you see, the Freedom of Information Act had not yet been passed.

The "environment" was not in any better shape. The era of the smoke-belching municipal incinerator had not yet passed. Municipal and industrial wastes alike were deposited and often burned through "open" burning at municipal dumps. These dumps were located less with regard to environmental effects than to hiding them in places where their foulness would not be noticed, such as in a ravine or on the banks of a river.

Air quality was the province of municipal health directors, who were often unpaid physicians with busy private practices. The state Water Resource Commission, to its credit, had begun to exert some authority over discharges into surface waters, and the Clean Air Commission had begun to address some of the state-level policy questions involving air pollution – in a setting, if memory serves, of bitter controversy. State decisions as to the investment of taxpayer monies and other resources were made entirely apart from any consideration of the environmental effects.

There was no protection at all for inland wetlands.

At the national level, in January of 1970 the most significant new laws lay ahead, these being the 1972 amendments of the Federal Water Pollution Control Act, the continuing amendment of the Clean Air Act, the Resource Conservation and Recovery Act of 1976, and "Superfund," to mention only four of perhaps 20 landmark federal statutes which have emerged over the last 15 years or so.

My point is simple. How much has changed. The establishment of the Department of Environmental Protection, through legislation which largely is the handiwork of its present commissioner, certainly did not resolve environmental institutional problems. However, it did bring under one roof, not only for administrative but also for policy making and enforcement purposes, the previously semi-autonomous boards and commissions, including those which had been attached to the Department of Health. The commissioner of DEP was not simply to be a passive administrator, but also a policy creator and coordinator and an environmental advocate.

Important as it was, this reform would have constituted simply moving furniture around the bureaucratic warehouse unless, along with it and later, had come significant legislation. Along with the Freedom of Information Act, the Administrative Procedures

The requirement is consensus among ourselves on what needs to be done, and clear-eyed and persistent management toward our objectives.

Act, and the Environmental Protection Act, which opened wide doors for citizen participation, there has been enacted legislation in virtually every significant area of environmental concern. This has included our own state's Environmental Policy Act, the laws relating to coastal zone management, diversion of water, groundwater discharges, inland wetlands, solid and hazardous waste, and air quality. We have seen the creation of entirely new agencies of action and oversight, such as the Council on Environmental Quality, the Connecticut Siting Council, and the Connecticut Resources Recovery Authority.

Even new laws will not move us very far along the path toward our environmental goals unless they are coupled with a commitment of funds, energy, and resources by the state government. For environmentalists, I suppose that that commitment will never seem sufficient, but it is noteworthy to me that the environmental progress which I have described as beginning in the administration of Governor Dempsey has been maintained by later administrations of both political parties. Connecticut environmental goals have been supported on a bipartisan basis both in the legislature and in the executive branches. By and large, environmentalism has not been a political issue in Connecticut except, perhaps, for candidates trying to outdo each other in convincing us that they will reach our goals faster.

The results of these changes are there for us to see and enjoy — cleaner air and water, protected wetlands, and decision-making processes that are open and reflect environmental concerns.

But there is another thing that is needed if we are to continue our progress toward those elusive goals. That additional requirement is consensus among ourselves on what needs to be done, and clear-eyed and persistent management toward our objectives. Connecticut has a history of reaching consensus on environmental issues. I can tell you from personal experience that there were many things that we members of the Governor's Committee on Environmental Policy did not agree on. We came from different experiences, had different concerns, and often had little in common. However, we were able to reach consensus on many difficult issues, despite our parochial affiliations, because at heart we had a common concern — our concern about Connecticut's future and the health and welfare of the people and natural systems which make up this state. I know that you would not be here today unless you shared that concern, and I can't think of anything better for us all to be doing than using the Environment/2000 report as a time to regain our common focus.

If historians may be permitted to express concerns about the future, allow me to express briefly some of mine.

First, the most significant regulatory and remedial programs affecting Connecticut are federal laws administered by federal agencies. To the extent that leadership in Washington becomes confused or divided and federal funds dry up, we are at risk. The wars among the House and Senate and the White House over the reauthorization of the Clean Air Act, refunding Superfund, and the new pesticides law provide unhappy examples of what happens when the environment gets caught up in hardball politics.

Second, closer to home, I would hope for even greater coordination among the units of DEP regulating pollution so that, to the extent federal law permits it, our regulatory and enforcement policies become less media-specific and more oriented toward affirmative management of waste outputs. Remember that when we speak of "pollution" we are really talking about putting waste into one environmental medium or another. The issue is not: Don't put it here. The issue is: Where do we put it? We should never

thoughtlessly provide an incremental benefit to one environmental resource at the cost of another; and we certainly should look carefully at the environmental, social, and economic cost of all incremental gains.

Third, I am concerned about the continuing drain of competent personnel from the department, and have to wonder whether they will be replaced by people of like competency and enthusiasm. The salaries which capable technicians can command in the marketplace are such that we may be at risk of losing people who cannot be replaced at existing salary and benefit levels. Not only environmentalists should be concerned about this, but also people from business and industry, which need a sound regulatory climate.

Fourth, I am concerned about the level of citizen participation in, and prodding of, governmental processes. Is there enough? Many of the new laws were designed with the expectation of that participation. Are we today willing to devote the same amount of time and energy to the work of overall environmental progress as were our predecessors in the '70s? Or do we react only to protect our personal backyards or as parochial opportunists? Are our energies spent resolving environmental problems or simply shifting them to someone else's shoulders?

Finally, let me close with my greatest concern. We must energize and upgrade our acquisition of open space before the cost of land which should be protected rises beyond the limits of the public purse.

The modest federal funds which used to provide some assistance for this program have disappeared. The Bureau of Outdoor Recreation, which used to administer the federal open space program, has been dismantled. We have lost valuable time. While we managed to regroup to a degree in the last session of the General Assembly with the bill authorizing state bonding for open space acquisition and looking to the creation of a public-private partnership to provide still further financing, I am concerned that this is too little and too late. We cannot do anything about the "too late," but maybe we ought to think about the "too little."

Although this may be heresy to some, I wonder whether we shouldn't look seriously at a restructuring of the real estate conveyance tax so that it generates more revenues, and then dedicating those revenues to a more aggressive land acquisition program. A flat, across-the-board tax rate which does not discriminate among different kinds of transactions may not be the way that this tax should be structured.

Perhaps certain transactions should be more heavily taxed than others, and some transactions perhaps should be taxed at a lower rate than they are now, if at all. The net increase in revenues should be returned to the public purse to support land acquisition. Time is running out.

We hold these truths to be self-evident: that it is our responsibility — yours and mine — to:

- Fulfill the responsibility of each generation as a trustee of the environment for the generations yet to come;
- Assure for everyone safe, healthy, and nurturing surroundings;
- Use resources for man's benefit but not so as to degrade the environment or create risks to anyone's health or safety; and
- Preserve our national heritage, both natural and man-made, so that we may all have a choice among a diversity of ways to live — both ourselves and those who will follow us.

I hope that we all can draw renewed direction from these words, so that they are not simply a sentimental part of Connecticut's environmental past, but inspire its future as well.

Have a productive day. ■

A few tips on showing your Christmas tree the appre





The Spirit

Lois

Make your tree feel at home. Until you are ready to set it up and decorate it, keep your tree in the coolest place possible — an unheated porch, garage, or breezeway is ideal. After all, your tree's home was the Great Outdoors.

Offer your tree a drink. Instead of offering it a holiday eggnog, make sure your tree has plenty of its own favorite drink — buckets of water, water, water — even now, outside, before you're ready to set it up and decorate it. Set it in a bucket of water, and sprinkle its needles every day or so.

Give "seconds." When you're ready to bring the tree inside, give its base a good shake against something solid (sort of like a hard handshake) to knock off any loose, dried needles. Then refresh its drinking tubes by cutting a slice diagonally off the end. Make this slice one to two inches thick if you have enough stem to do so. (A diagonal cut exposes a larger surface-area to that all-important water.)

Keep the drinks handy. If you don't have a stand that holds water, consider getting one (or contriving one, somehow). You'd be surprised at how much it will take — maybe even more than the quart-a-day we human beings are encouraged to imbibe. Check its water well every evening, and remember, a well-watered tree gives off more fragrance and is considerably less of a fire hazard. (No water additives are necessary. Laboratory tests have shown that commercial products which claim to keep a tree "fresh" actually have no effect at all.)

Think of the tree's comfort. Find a place for the tree that doesn't make it uncomfortably hot and dry. In front of a window is good. Not only is it likely to be cooler there, but also you and all passers-by will see it more often and get extra enjoyment from it. (Don't use a window that has a radiator or baseboard under it.)

And, after the holidays are over, **keep giving the tree love.** When it's time to take your tree down (two or three weeks is plenty of time to have it indoors), think about ways you might still enjoy it.

If it's placed outside your picture window and hung with bird yummies, its visitors will give you entertainment in a season when outdoor entertainment is at its lowest ebb. When you're housebound because of snow or cold winds, the birds will be in desperate need. Your generousity will bring you many fascinating hours of reward.

While a tree-size bird-feeder is probably first choice, you might prefer to clip off the branches to make a window bouquet for a win-

ciation it deserves.



of the Tree

by
Kelly



dow box or for planters on either side of the front door. You'd be surprised at how much that touch of green will perk up the place.

Another use for the tree is as a mulch. It will help keep the wind from blowing away the leaves or hay you piled over the chrysanthemums and rose bushes. Or several trees gathered together can be used for snow fencing, windbreaks, or wildlife shelters at the edges of the woodlot. (Just don't put them near your pet apple trees, or you'll be giving the neighborhood mice and rabbits a place to hide when you're out wondering who's nibbling at the bark.)

Whatever you do — before, during, and after Christmas — be sure that you **honor the spirit of the tree.** It took eight to 12 years to grow. Your care of it will enhance your pleasure and ensure that its life was meaningful.

To **keep a living tree alive**, it is necessary to prepare in advance. Dig a hole where the tree is to be planted. Make sure it is at least one foot in diameter larger than the ball of earth where the tree will be. Fill the hole with leaves, and mark it with a stake (so it will show above possible snowfall).

Store the loose dirt in the cellar or other placess where it will be cool, but will remain unfrozen.

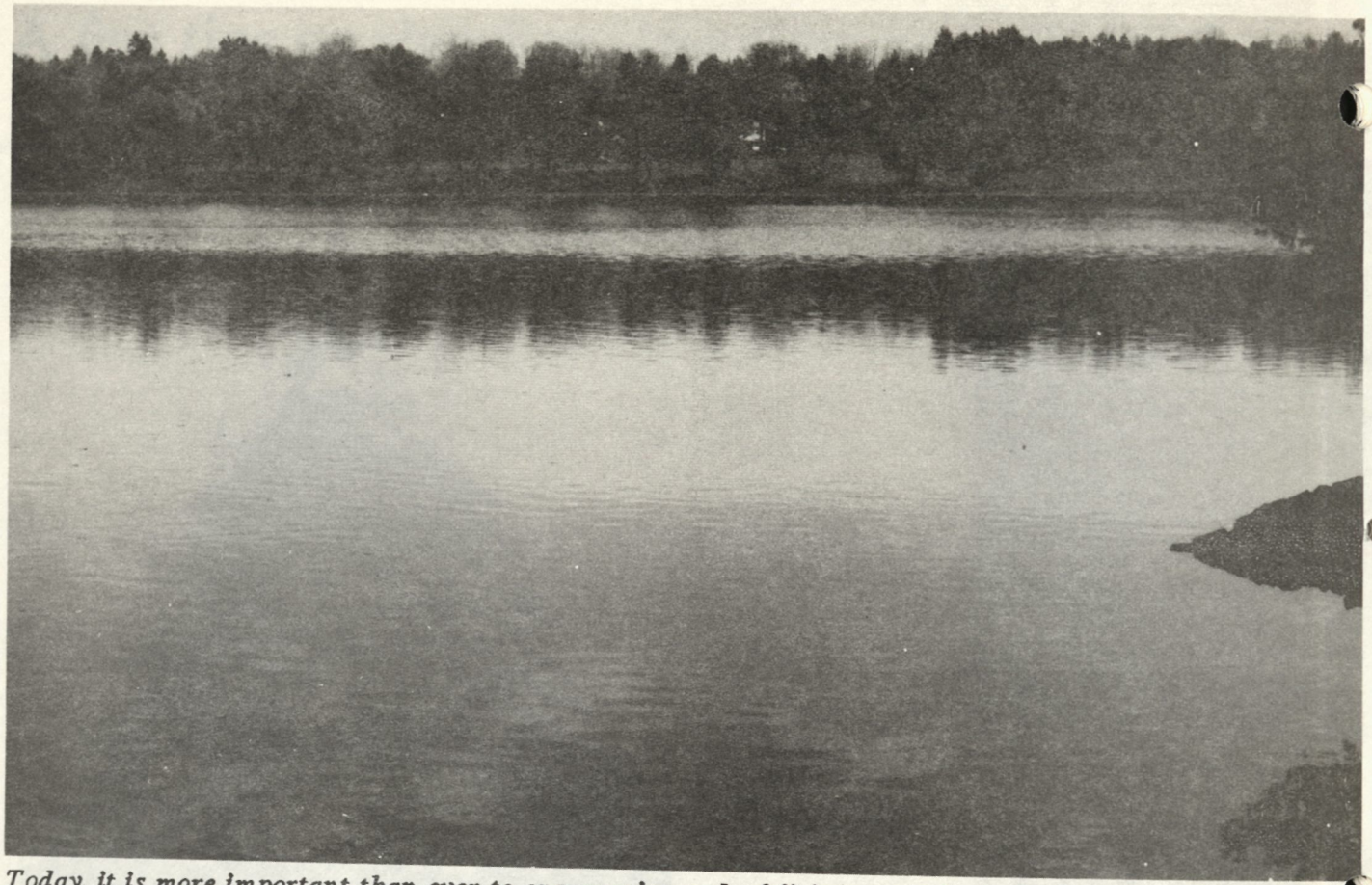
Keep the tree cool for as long as possible. A living tree should not be kept in the house more than seven to 10 days. (In a heated room, it may "break dormancy" much too early — which means it may think it's spring and start to grow.)

Water the tree sparingly — a small amount of water to the ball every two to three days — while it is in the house. (Again, you don't want to encourage it to start to grow now.)

Plant the tree no later than January 1, if possible. When planting, leave the burlap and cord intact. They will help hold the ball of earth tight, and will disintegrate when the weather warms and the tree starts to grow. Pile in the loose dirt which you stored in the cellar, and add four to five pails of water (even though it may freeze). Rake a mulch of leaves around it.

After planting, you might like to put a stake at the base of the tree, with the date, to help you remember a special Christmas with a special tree. ■





Today, it is more important than ever to ensure wise and efficient use of our drinking water resources.

A New Map Shows our Water Resources

by
Howard W. Sternberg III
Senior Environmental Analyst
Natural Resources Center

We cannot afford to waste or throw away water. Water sustains life. We need it for cleaning, bathing, processing food, cooling, manufacturing, and carrying wastes. We need it to drink.

The amount of water we drink is small compared to what we use when we bathe, wash dishes, flush the toilet, and wash clothes. Individual water-use habits vary but, on the average, each of us uses approximately 75 gallons of water a day at home.

Water is supplied to most homes in Connecticut by means of community water systems. This is defined as a public water supply serving at least two residences, or 25 residents, throughout the year. There are over 600 community water systems in Connecticut, providing water service to 84 percent of the population of the state. The remaining 16 percent relies on private residential well water.

Community water systems vary tremendously in size, water source type, and demand. In the greater Bridgeport, Hartford, New Haven, Norwalk, and New London areas, water service is provided by a number of large community water systems. There are approx-

imately 85 large community water systems in Connecticut, each providing water service to more than [illegible]00 people year-round. Three of these systems serve nearly 400,000 people each. The large systems in Connecticut serve the majority of the population using public water and depend primarily on water piped in from reservoirs in outlying rural areas.

The rest of the community water systems in Connecticut are relatively small. These include residential developments, apartment complexes, condominiums, and mobile home parks that rely on one or two community wells. Most of these small systems are dependent upon well water and provide primarily residential water service.

In Connecticut, community water systems supply most of the water we use for residential, commercial, and light industrial purposes. In 1985, approximately 361 million gallons of water flowed through community water system water mains every day. Most of the water was withdrawn from surface water sources for use at home. For instance, in 1985, residential water use accounted for 178 million gallons per day (MGD), or 49 percent of all of the water withdrawn by community water systems. During the same period, these systems also supplied 62 MGD in industrial water service, 49 MGD in commercial water service, and 72 MGD through other water services, fire protection, system maintenance uses, and [illegible]ses due to leakage.

Surface and groundwater resources are used for drinking throughout Connecticut. In this state alone, there are approximately 1,500 community water system wells, 250 community water system reservoirs and stream diversions, and nearly 200,000 private residential wells. Clearly, we must thoroughly understand how these surface and groundwater sources fit the demand picture today in order to meet the drinking water needs of tommorrow.

Connecticut's population growth and economic expansion naturally result in changes in demand for water. Despite a relatively abundant supply, demands may soon exceed supply in some areas. In light of increasing demands, localized water quality problems, and periodic water shortages, it is more important than ever to ensure wise and efficient use of our drinking water sources.

A New Map

The Connecticut Geological and Natural History Survey recently published a new water supply map of Connecticut. This new map, entitled *Community Water Systems in Connecticut*, was prepared to help government agencies, community water systems, and [illegible]e general public understand present drinking water needs in Connecticut. The map is also a tool for planning for the future.

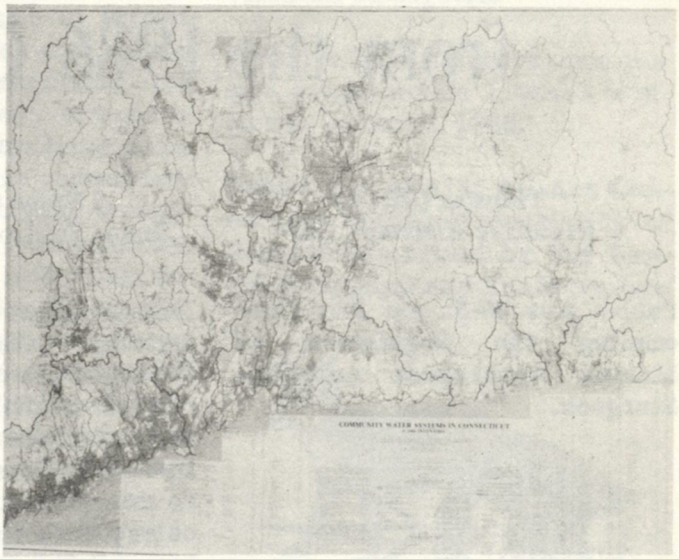
Water service areas, well locations, reservoir locations, water supply watersheds, water company-owned land, water filtration plants, and interconnections between adjacent community water systems all appear on this new map. The map also delineates town boundaries, roads, drainage basin boundaries, and streams.

As a result, all of the areas served by community water systems, and all community water system wells and reservoirs within a particular town or basin, can be easily located using this map. This map also clearly defines the more than 200 square miles of water company-owned land, and the more than 800 square miles of water supply watershed in Connecticut.

How many miles is water piped from reservoirs in Litchfield and Warren before it is used in Waterbury? Where does Connecticut share watersheds with New York and Massachusetts? How can the Bridgeport Hydraulic Company sell water to the New Canaan Water Company? How many people are served by nearly 30 community water systems in Danbury? Where are all of the community water system wells in the Farmington River Basin? These questions and more can be easily answered using this new map.

There has never been a state water supply map like *Community Water Systems in Connecticut*. From well locations to residential population served, this map is loaded with information about how and where we use drinking water. *Community Water Systems in Connecticut* measures 42" x 55" and is at the same scale (1:125,000) as the state bedrock geology map, the state dam map, the state drainage basin map, and the state ground-water availability map.

Copies of the new map may be obtained from the DEP, Natural Resources Center, Publication Sales, State Office Building, Room 555, 165 Capitol Avenue, Hartford, CT 06106. Telephone (203) 566-7719. The total cost, tax included, is $12.75. ■



The new map prepared by the Natural Resources Center is a valuable tool for planning for future drinking water needs in Connecticut

A Message from the Commissioner:

The 1986 session of the General Assembly proved to be very successful for the Department of Environmental Protection. The DEP lobbied hard for the legislation creating bold and innovative environmental programs such as Governor O'Neill's Clean Water Fund, the new program for monitoring dioxin emissions from resource recovery facilities, and an Act Concerning a Natural Heritage Trust Program, which will ensure the protection and preservation of Connecticut's open spaces for future generations.

The DEP worked with Governor O'Neill's office and the General Assembly in a cooperative effort to produce these fine pieces of legislation. The quality of the bills is a tribute to the agency and to the legislative process.

The following bills are concerned with Conservation and Preservation Division of the DEP. In addition to these bills, I am pleased to note the following capital improvement bond authorizations for the Conservation and Preservation Division:

- Grants-in-aid to municipalities for open space and land acquisition and development for conservation and recreation purposes = $5 million.
- Modernization and improvement of state-owned recreational and conservation areas = $2 million.
- For Silver Sands State Park in Milford, access roads, uitilities, parking/bathhouse complex, and beach development = $1.3 million.
- Land acquisition and development of inland and shoreline recreational areas = $1.5 million.
- For the American Shakespeare Theater State Park in Stratford, alterations and improvements = $250,000.
- Acquisition of land at J. Alden Weir farm in Ridgefield and Wilton = $2.7 million.

We at the DEP are very proud of these legislative accomplishments, and are pleased that it will be the citizens of Connecticut who will enjoy the benefits to be derived from them.

Stanley J. Pac, Commissioner
Department of Environmental Protection

Environmental Legislation from the 1986 General Assembly

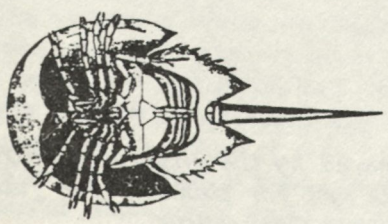
Compiled by

Thomas Gaffey
Executive Assistant, DEP

Tessa Gutowski
Senior Environmental Analyst

Elaine Korenkiewicz
Wildlife Biologist

Public Act 86-5: An Act Concerning the Regulation of Marine Arthropods and Sea Sturgeon.



This act allows the DEP to regulate horseshoe crabs and other marine arthropods under the same law that regulates finfish and crabs. In the past, because horseshoe crabs are not true crabs (crustaceans), there was no management of them by statute, or any authority for management by regulations. The substitution of the words "marine arthropods" for "crabs" now includes all such species. Horseshoe crabs are exploited by commercial fishermen for bait and are used for scientific research. Although there is at present no recognized resource problem with this species, a number of citizens have indicated some concern for the current level of exploitation.

This act also repeals the existing law forbidding the taking, possession, sale, or exchange of sea stur-

geon captured in state waters.

Effective date: July 1, 1986

Public Act 86-26: An Act Concerning Closed and Extended Open Seasons for Regulated Species.

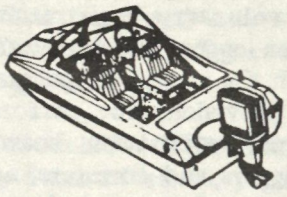


This act permits the commissioner of the DEP to declare a closed season or extend an open season for the taking of regulated species by sport fishing, hunting, or trapping to meet resource management objectives.

Currently, the commissioner of DEP is authorized by statute to declare closed seasons for taking wildlife only to lessen forest fire danger. Following such closure, seasons may subsequently be extended for equal time. No provisions exist to permit closure or extension of open seasons for taking wildlife in response to unexpectedly low or high harvest resulting from weather conditions and other factors. For example, a certain harvest level is necessary to maintain a stable or reduced deer population to prevent vehicle/deer collisions, damage to ornamental plantings, etc. Should weather conditions reduce normal season harvest, an extended open season would be warranted to achieve desired harvest levels. On the other hand, there can be too many deer removed as well as too few. Favorable hunting conditions could result in an extremely high harvest during the first week of the shotgun season. Under these circumstances, it would be beneficial to have the option to shorten the season if necessary. Having the ability to adjust season length is a step toward more fine-tuned and scientific wildlife management.

The DEP is required to publish notice of any such action in the Connecticut Law Journal.

Public Act 86-89: An Act Concerning the Duties of Town Marine Officers, the Operation of Motor Boats on Gardner's Lake, and the Operation of a Training Boat on Killingly Pond by the East Killingly Fire Department.



This act expands the authority of town marine officers to include enforcement of section 53-134, which concerns the removal of identification numbers from outboard motors, and enforcement of section 53-190, which concerns motorboat engine sizes on Killingly Pond, Alexander's Lake, and Lake Wononscopomuc, as well as enforcement of section 53-191, which concerns engine sizes on Bolton Pond and Gardner's Lake. It would also correct statute references concerning violaviolations of the littering law.

The act allows Bolton, Vernon, Coventry, Salem, Montville, and Bozrah marine officers to enforce the Gardner's Lake and Bolton Ponds motorboat restrictions, and Killingly and Salisbury officers to enforce the motorboat restrictions on Killingly Pond and Alexander's Lake in Killingly and Lake Wononscopomuc in Salisbury, respectively.

The act prohibits motorboats, regardless of engine size, from going faster than six miles an hour on Gardner's Lake between sunset and 8:00 a.m. Current law bans motorboats with engines larger than seven h/p from the lake between sunset and sunrise.

The act changes the penalty for violating the Gardner's Lake motorboat restrictions from a maximum $50 fine to an infraction. It makes the same change in the penalty for operating a motorboat with an engine larger than six h/p on Bolton Ponds, and for operating a motorboat with total piston displacement greater than 12 cubic inches on Killingly Pond and Alexander's Lake in Killingly and Lake Wononscopomuc in Salisbury, with an exception for the East Killingly fire department's operations on Killingly pond.

Effective Date: June 1, 1986

Public Act No. 86-97: An Act Concerning the Authority of the Commissioner of DEP in Administration of Forest Fire Prevention and Control Programs and Authorizing Municipalities to Establish Pension Systems for Members of Volunteer Fire Departments.

This act clarifies the authority for administration of fire programs directed by the state commission on fire prevention and control and those under the responsibility of the commissioner of the DEP. The act exempts DEP from a law requiring the state fire administrator to review any state purchase of fire apparatus and to coordinate fire service personnel training and education.

The act also allows towns to establish pension funds for active volunteer firefighters.

Effective Date: Effective upon passage, except Section 1, which is effective October 1, 1986.

Public Act 86-111: An Act Concerning the Confidentiality of Reports Submitted by Fur Buyers, Trappers, and Taxidermists.



This act provides for individual confidentiality of reports submitted to the commissioner of the DEP by hunters, fur buyers, and trappers in order to promote compliance with reporting requirements, increase accuracy, protect proprietary business information, and prevent harassment of individuals. The act allows the commissioner to authorize release if the person reporting consents, or if the information is to be used for wildlife research, management, or development.

Information collected by hunters, fur buyers, and trappers provides the necessary harvest data to determine the impact of the harvest season on furbearer populations. Such information, including harvest totals, timing and distribution of the harvest, and the average take per hunter/trapper, is necessary for making proper management decisions concerning these species. However, sportsmen have been reluctant to provide such detailed information, feeling that others would have access to the reported information. This information is particularly important for furbearer management, since pelt prices may fluctuate markedly from year to year and directly affect the harvest pressure on the resource. Harvest totals are necessary for planning harvest strategies for each species. The need also exists to determine the attitudes and interests of harvester groups, since these individuals directly impact the resource and must also be managed.

Public Act 86-249: An Act Concerning the Use of All-Terrain Vehicles on State Land.

This act requires all-terrain vehicle operators to have a certificate from the commissioner of the DEP for use on state land. The vehicles also must be registered with the commissioner of motor vehicles as required under current law. The act requires DEP to evaluate state properties for all-terrain vehicle use, and to make some land available for such vehicles.

The act also sets a minimum age of 12 for operating all-terrain vehicles on state land, and requires development of safety standards. Finally, it specifies that the operation of snowmobiles or all-terrain vehicles on frozen bodies of water is subject to water company and state health department restrictions.

Public Act 86-257: An Act Concerning Voluntary Registration for Loggers and Foresters.

This act requires the commissioner of the DEP to establish by regulation a voluntary registration program for loggers and foresters practicing in the state. The program includes provisions for performance standards, registration boards for both loggers and foresters, and for publication of an annual roster of registered loggers and foresters.

Registration regulations must include: standards and procedures for application and registration, procedures for reviewing complaints against registered loggers and foresters, and standards and procedures for cancellation and reinstatement of registration.

Public Act 86-270: An Act Concerning Penalties for Unregistered Vessels.

This act increases the penalty for second and subsequent violations of the law against operating an unregistered boat. Under current law, the penalty is a fine ranging from $25 to $200. The fine remains the same, regardless of the number of violations. This act retains this fine for a first offense, but for subsequent offenses within one year of the initial violation, the fine is increased to between $200 and $500.

The act also allows law enforcement officers to apply to the courts for authority to seize an unregistered boat and to keep it until its owner proves required fees have been paid. The act exempts officers from liability for their actions in seizing unregistered boats.

Public Act 86-370: An Act Establishing a Program for the Conservation of Nonharvested Wildlife.



This act requires the commissioner of the DEP to establish a comprehensive wildlife management program for nongame species. The program must include: resource inventory, habitat conservation, monitoring of environmental impacts, conservation of endangered and threatened species, wildlife recreation management, wildlife conservation education, private landowner assistance, urban wildlife conservation, problem-animal management, and scientific research, planning, administration, and development. Special protection for endangered species or subspecies of indigenous wildlife to maintain and enhance their numbers is declared a state policy.

An advisory board will be established to make program recommendations to DEP. Members will be reimbursed for reasonable and necessary traveling expenses. The board must elect a chairman by July 1, 1986, who is unaffiliated with any state administrative agency.

The DEP is required to submit a report to the environment committee by February 1 of each year.

This act also requires the DEP to establish a state wildlife stamp and print sales program, and to use revenues from it for the nongame wildlife program.

Effective Date: Effective upon passage, execept that Section 1 and Sections 3 to 5, inclusive, shall take effect July 1, 1986.

Public Act 86-406: An Act Concerning a Natural Heritage Trust Program, Use of Certain Railroad Rights of Way in Eastern Connecticut, Lands of the

Connecticut River Gateway Commission, and the Conveyance of Certain State Land to the Town of Tolland.

This act establishes a recreation and natural heritage trust program to acquire additions to existing state conservation lands and other properties with important natural features. The act establishes a trust fund financed with a $2 million bond authorization. The act creates an account for maintenance of purchased properties and allows joint state and private cooperation in acquiring and managing properties. The act denotes these entities as "cooperators." These are non-profit land-holding organizations, municipal conservation commissions, or similar bodies.

The act also establishes a task force on open space preservation, and increases the powers of the Connecticut River Gateway Commission.

The act transfers 26.6 acres in Tolland from the commissioner of the DEP to the Tolland board of education, subject to approval by the state properties review board, and authorizes payment of administrative costs of making the conveyance.

Finally, the act requires the commissioner of the DEP to use a 19.6 mile railroad right of way running from Manchester to Willimantic River for recreation. The right of way must be leased or conveyed by the transportation commissioner to the commissioner of the DEP under SA 86-29.

Effective Date: Upon passage, except the portions related to the trust fund and transfer of land in Tolland take effect July 1, 1986.

Public Act 86-418: An Act Concerning Allocations from the State Boating Fund and a Study of Commercial Recreational Boating Facilities

This act deals with distribution of boating fund revenues, permissible expenditures from the fund, and a study of boating facilities. By law, annual revenue from boat registration and numbering fees is distributed as follows: (1) the first $1 million goes to the state boating fund; (2) if sufficient revenue remains, towns receive payments equaling their property tax revenues on boats according to their October 1, 1978, assessment list; and (3) if there is still more money remaining, it too goes to the boating fund. This act requires that, if annual fee revenue is insufficient to cover the $1 million payment to the fund and the full payment to towns, payments to towns must be made in full from any money in the boating fund that remains unallocated at the end of the year.

The act also allows the commissioner of the DEP to use boating fund money for boating education and marine patrols as well as the already-allowed expenditures for boating safety; boating law enforcement training programs; construction, acquisition, maintenance, and improvement of boating-related recreation and navigation facilities; and state and local expenses for enforcing state boating laws and regulations. Under existing law, a town can already apply to use available fund money for boating safety education.

Finally, the act establishes a 16-member task force to study recreational boating opportunities. The task force must report its findings and suggested legislation to the governor and the General Assembly by January 1, 1987.

Effective Date: Upon passage and applicable to the boating fund revenue year ending October 31, 1985, and each year thereafter. ■

This is the first of two articles on legislation from the 1986 Connecticut General Assembly.





The reason Rocky Neck State Park, and all of Connecticut's other state parks, looks so beautiful is that people work at it.

A Salute to the Park Maintainers

Text and Photos
by
Kim Nauer
Environmental Intern

At Rocky Neck State Park, there are four permanently-assigned maintainers in charge of 800 acres. They are responsible, quite simply, for maintaining everything that makes the park safe, clean, and beautiful. They have built roads, signs, fences, flower beds, stables, lifeguard chairs, and picnic tables, as well as the concession stand, staff buildings, and campgrounds. Without them, the beaches would be covered with trash, bath houses would be flooded, the trails would disappear under piles of fallen brush, and the buildings and grounds would deteriorate.

"The maintainers are the backbone of the park," says Park Manager Kevin Blados. "People may be aware of what they do, but not who does it. They aren't noticed because they don't deal with the public."

Like many public servants, the park maintainers do the job because they like it. Robert Bartlett, a quality craft worker in carpentry, has worked at Rocky Neck for 23 years. "I like the job, like to be outside, like the area," Bartlett says. "It's a beautiful place. That's why I stay here so long."

The Evolution of the Park

Rocky Neck State Park was established in 1933. Since then, there have been four park managers. Working with each of them, Robert Bartlett has witnessed the evolution of the park to what it is today.

When Rocky Neck State Park opened, the main attractions were a huge stone pavilion built by the Works Progress Administration (WPA), a small concession stand, a ticket booth, and acres of beach and woods. Today, while Ellie Mitchell Pavilion and the beach remain the same, there have been significant changes.

"We've built the new concession building, the maintenance shop, and the lifeguard building," Bartlett said. They also built the stables and corral needed for the mounted park patrol, as well as a new ticket shed, several stone-walled gardens, and 400 picnic tables.

In addition, with the help of the Connecticut Conservation Corps and Young Adult Conservation Corps, the park maintainers have improved campsites,

built a new boardwalk, and constructed fencing along the beachside railroad tracks. Only the two beach houses were built by outside contractors.

"Pretty much everything has been changed," Bartlett said. Even the magnificent pavilion has had plumbing and electrical renovation.

The Daily Chores

Construction is only a small part of what the maintainers do. They spend the greater part of their time keeping the park area as attractive as possible.

"The maintainers can be involved in anything from assisting other department personel – as in stocking fish or forest fire suppression -- all the way to the maintenance tasks performed in the park," Blados said.

On a typical summer day, Environmental Maintainter II Lauren Dziengielewski was changing mower blades, while Bartlett was rebuilding an area of picket fence damaged by Hurricane Gloria. Others were clipping hedges, planting grass, and picking up trash.

While all the maintainers have a specific area of individual expertise, in general it can be said that all of them do everything. The more difficult tasks are usually handled by Environmental Maintainer III Quality Craft Workers, while less complex chores are done by Class I Environmental Maintainers and seasonal workers. But, the maintainers stress, titles don't mean much.

Frank Polivka is a Quality Craft Worker, specializing in mechanics. So, is that all he does? "Sometimes. Most of the time, no," he said. The job requires that things be fixed when they need fixing. The rest of the time, he helps maintain the park with the others. Herb Dittmer, a maintenance worker III, says, "We all do what we have to. That's the nature of the job."

The workers begin their apprenticeship at Maintainer I level and, as they learn more complex skills in mechanics, carpentry, electrical work, plumbing, and grounds care, move up to Maintainer II and III levels, and eventually to Quality Craft Worker level.

"The craft workers still perform the same basic duties as the other positions," Blados said. "When they came here, they may have had only basic carpentry skills, but with time, experience, and work with some of the quality craft workers, they develop their skills."

Future Projects

In the future, the maintainers hope to add to their workspace. They plan to build an addition to the maintainence shop to make more room for the mechanical work. And, of course, as aways, tables must be fixed, trash cans must be emptied, the lawn must be mowed, and the beach houses must be swept. Because there are fewer workers than in other times, some say it is a little harder to keep up. But the work gets done – if not in the summer, then in the winter.

"One question we often get from the public is, 'What's done in the off-season?' People seem to think that during the summer, we're busy, but because of the lower attendance in the winter, we're not," Blados said. "The park staff is just as busy," he said, "because they have the time and room to do projects and repairs that they couldn't do with summer bathers and campers around. The object is to get the work done without inconveniencing the public."

A Word of Appreciation

The next time you visit Rocky Neck State Park, or any of Connecticut's state parks, you might spend a minute or two in appreciation of what you probably have taken for granted; our state parks are always clean, the facilities are always in good repair, the grounds are always well maintained. Sometimes, because our parks are so lovely and enjoyable, we forget that it takes a lot of hard work to keep them that way. From all of us who love and enjoy Connecticut's state parks, to those who work to keep them beautiful – thanks. ■



The boardwalk at Rocky Neck was built by the park maintainers.

Trailside Botanizer

Balsam Fir

by
Gale W. Carter
Illustration by
Pam Carter



The fragrance of the dried needles of the balsam fir (*Abies balsamea*) surpasses that of any other conifer in New England. Fir balsam pillows make us think of the north woods. The characteristic odor and the persistence of the needles on the tree, lasting even a month without water, make it the preferred evergreen (if available) as a Christmas tree. The spruce, another common Christmas tree, has needles that drop off the tree soon after the tree is cut.

Balsam fir is only rarely found growing in Connecticut naturally, but is used in landscaping, and sometimes it escapes from cultivation. It is near the southern limit of its range. There are a few places in the Northwest Highland where it may be growing naturally. Its preferred habitat is in cool, moist areas, including swamps.

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In addition to its fragrance, balsam fir can be easily recognized by its flat needles that are whitish beneath and are without prickles. Spruce leaves are square and prickle-tipped.

Balsam fir has gray bark with many resin blisters that yield a substance known as Canada balsam. Its cones are rather distinctive. They are large and cylindrical and stand erect on the branches of the tree. Other conifers have cones that dangle downward. The flowers of the balsam fir are small and inconspicuous. They appear from May to June.

The male and female flowers are found separately on the same tree. The male flower hangs downward from the underside of the branch above the middle of the tree. The female flower appears on the upper side of the twigs and develops into the erect cones.

Canada balsam obtained from the resin blisters was once used for mounting and preserving specimens for microscope study. Many birds make use of the seeds of balsam fir. These include black-capped chickadees, purple finches, and evening grosbeaks. White-tailed deer use the twigs for browse.

The Night Sky

Only the Magi Knew

by
Francine Jackson

If only the Magi had been more specific. It has always been said that they followed a "star" into Bethlehem; it has never been said exactly what that star was. This elusive "Star of Bethlehem" has puzzled astronomers, philosphers, and theologians for centuries.

In attempting to find a scientific explanation, astronomers have been stumped by the use of the word "star"; because in early times everything in the sky was termed a star, modern day science has to content itself with what it wasn't, and hope whatever is left could possibly pass as an acceptable answer.

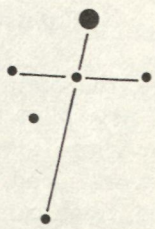
Eliminated early are comets and meteors. Comets, or "hairy stars," were symbols of evil, not conducive to religious worship. "Falling stars" — meteors — are too common and last too short a time to be a sign of anything.

The usual explanation for the Star of Bethlehem tends to fall on planetary alignments. Close approaches of the planets Jupiter, Saturn, and Mars in 7-6 B.C., and Jupiter with the star Regulus in 2 B.C., are generally considered the two most probable answers.

Unfortunately, accurately coming up with a true Star of Bethlehem may never happen. For those of you who would like to be able to find a good heavenly sign in the sky, however, there is one of our summer constellations — Cygnus the Swan — which appears just above the western horizon at this time of year. Because some its wing stars are too dim to be seen against city lights, only part of Cygnus can generally be seen. This part comprises its five brightest stars which stand up in the west and which are known as the Northern Cross. Another candidate for the Star of Bethlehem?

Only the Magi knew for sure. ■

The Northern Cross in Cygnus



West

Letters to the Editor

I just had the opportunity to read the article "No Such Place as Away," on the management of hazardous waste in Connecticut, in the September *Citizens' Bulletin*. I thought it to be informative, accurate, and positive. Thank you.

James W. DeWitt
President
Connecticut Association of Metal Finishers

May all your goals for the year 2000 be achieved.

Donald Hazelton
Dalton, Massachusetts

Your *Citizens' Bulletin* is just great. It is the equivalent of the big national conservation-ecology type magazines, but gives us information on our state which gets lost in the nationals. I read every word of it.

Mary P. Isherwood
Storrs

The *Bulletin* needs no suggestions. There is much of interest in every issue. It will be a pleasure to "stick with you a couple of more years." At 81, I'm hoping to renew many more times.

Mrs. D. E. King
Branford

Regarding "Connecticut's Forests" by Ralph Scarpino in Volume 14 of the *Citizens' Bulletin*: The photo caption for the first photo and the lead paragraph have disturbing misinformation.

The settlers who first arrived in Connecticut followed the diminution of the glaciers and, thus, did not find an environment such as the author described. The European settlers did, however, find such an environment 10,000 years *after* Connecticut's *first* settlers.

The DEP apparently operates with selective memory. Occasionally an issue is devoted to Indians; all others ignore the very fact that they ever existed. Perhaps your department would be interested in a workshop on American Indian sensitivities, the effects of stereotypes, the contribution of American Indian society to the modern world. Call our Education Deparment to reserve a program. We look forward to hearing from you.

Karen Coody Cooper
Director of Education
American Indian Archaeological Institute

Dear Ms. Cooper:

Thank you for your letter. I am grateful for the opportunity to clear up any problems perceived in the *Citizens' Bulletin*. It is important that the *Bulletin* be as clear and correct as we can make it.

Let me quote the parts of the forestry article you spoke of. First, the photo caption: "The first settlers of Connecticut were greeted by a vast, largely-uninterrupted wilderness." Second, from the body of the article: "It is difficult for us to imagine the kind of landscape the settlers found when they first arrived in our section of southern New England."

The term "settlers" in both these cases refers to the first European settlers.

I am not certain what your concern here is. Are you saying (1) the "first" settlers were really the people we now call American Indians, who came here 10,000 years ago? This runs counter to a strongly-held theory that the Indians did not migrate over the Bering Strait 10,000 years ago, but that they are indeed, as they have always said, the "Original People," whose history in this area goes back hundreds of thousands of years.

Or, are you saying (2) that we erroneously gave the impression that the environment of 400 years ago was identical to that of 10,000 years ago? The article was not about geology, and no speculations were made about conditions 10,000 years ago.

Or, finally, are you saying (3) that by not specifically mentioning Indians we were, by that omission, implying that they did not exist? We didn't mention Indians in the article because the article was not about Indians.

In your third paragraph, you stated the DEP operates with selective memory, and that with one exception, all issues of the *Bulletin* ignore the fact that the Indians ever existed. I disagree with that. The *Citizens' Bulletin* has presented articles on Indian culture, tradition, and activities on a regular basis. We have continually sought and obtained the advice and assistance of American Indians in preparing these articles. We will continue to do so in the future.

Thank you again for your letter. I hope we can clear up any other confusion on this matter. Ed.

Endnote

"We must mobilize now to achieve the global possible. If we do, the future can be bright. We have sufficient knowledge, skill, and resources — if we use them. If we remain inactive, whether through pessimism or complacency, we shall only make certain the darkness that many fear."

Report from
Global Possible Conference
May, 1984

Perfect Gifts from the DEP

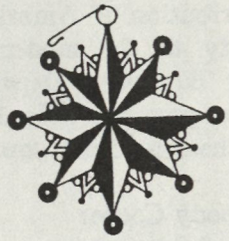
For some absolutely delightful Christmas gifts, perfect for anybody with an interest in Connecticut, you just can't beat the items available in the map and publication sales office of DEP's Natural Resources Center.

Bedrock Geologic Map of Connecticut – This two-sheet color map, set at a scale of 1:125,000, was completed only 15 months ago. The result of 25 years of research, the map, together with text references, cross sections, and inset tectonic map, constitute the most comprehensive bedrock study ever undertaken in Connecticut. Two-sheet color map set: $10.00.

The Face of Connecticut – People, Geology and the Land – Our best selling publication. The book ties



the landscape to geologic history, relating the cities, suburbs, farms, and forests of the present day to the continental movements of the last 500 million years. If you read one book about Connecticut, this should be the one. Extensively illustrated with maps, drawings, landscape photographs (color and black and white), and old lithographs: $12.95, 228 pages.



Rare and Endangered Species in Connecticut and their Habitats – In spite of its small size, Connecticut contains a remarkable diversity of landscape and biota. This report describes the state's critical habitats and ecoregions, and also provides brief descriptions of many of the plants and animals that are rare in Connecticut. Our infamous "Red Book" is complete with up-to-date lists of species of special concern: $3.00, 138 pages.



County Maps – In addition to our statewide seven and one half minute topographic map selection, we also have available the 1:50,000 scale county series. Each map covers one county in its entirity, showing wooded and open lands, lakes, ponds, and rivers, road networks, cultural centers, and, of course, elevations. The eight counties each have one map, except for Fairfield, which is divided into north and south. Each of the nine panels sells for $4.00.

To order, please add 7.5 percent sales tax and $2.00 per shipment, and write to DEP Map and Publication Sales, 165 Capitol Avenue, Room 555, Hartford, CT 06106, (566-7719).



And, finally, may we again suggest that a subscription to the *Citizens' Bulletin* is a great way to say Merry Christmas all year long. It's an especially nice gift for students. Five dollars a year, nine dollars for two years.

DEP Citizens' Bulletin

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